ABSTRACT

A pattern recognition adaptive controller configured to dynamically adjust proportional gain and integral time control parameters based upon patterns that characterize the closed-loop response. The pattern recognition adaptive controller receives a sampled signal representative of the controlled variable, and determines a smoothed signal based on the sampled signal. The controller determines an estimated noise level of the sampled signal and determines if the control output and process output are oscillating quickly based on predefined criteria. The controller adjusts the gain used by the controller if the control output and process output are oscillating quickly. If the control output and process are not oscillating quickly, the controller determines whether there has been a significant load disturbance, whether there is an insignificant pattern, and/or whether the control output is saturated. Based on the results of these determinations, the controller either leaves the gain and integral time unchanged or determines new gain and integral time. The adjusted control parameters are then used to control the actuator, thereby causing the controller to affect the process.